IN THE CLAIMS

1. (Currently Amended) A method comprising:

~~receiving a UPnP device description document from a device developer;~~

generating one or more service control class files including one or more service-control stub-methods according to a UPnP device description document received from a device developer ;

receiving the service control class files including ~~updated~~ the service-control stub-methods ~~modified~~ updated by the device developer for responding to actions and events received by a UPnP device described by the UPnP device description document; and

compiling the service-control class files and the updated service-control stub-methods along with a device class library and a UPnP software development kit to generate a UPnP device executable to provide an implementation of a UPnP network protocol for the UPnP device described by the UPnP device description document.

2. (Currently Amended) The method of claim 1, wherein generating the ~~service-control~~service control class files further comprises:

parsing the UPnP device description document to determine a root device including one or more services and one or more embedded device each including one or more services, each service defined by a service control protocol description (SCPD) file;

generating a service-control class file for each of the one or more services of the root device;

selecting an embedded device from the one or more embedded devices of the root device;

generating a service-control class file for each of the one or more services of the selected embedded device;

repeating the generating and selecting for each of the one or more embedded devices of the root device; and

once each of the service control class files are generated, generating a class service linker file based on the generated service-control classes, the class service file linker enabling linking the service-control classes during compiling to generate the device executable.

3. (Original) The method of claim 2, further comprising:

generating a root directory for the root device;

storing each of the one or more services of the root device within the root directory;

selecting an embedded device from the one or more embedded devices of the root device;

generating a sub-root directory for the selected embedded device;

storing each of the one or more services of the selected embedded device within the sub-root directory; and

repeating generating and storing for each of the one or more embedded devices of the root device.

4. (Original) The method of claim 2, wherein generating service control class files for the root device further comprises:

selecting a service from the one or more services of the root device;

generating a class generator object for the selected service of the root device;

passing an SCPD file describing the selected service, including a device identification code of the root device and a service identification of the selected service to the class generator object;

generating, by the class generator object, a service control class file based on the received SCPD file, the service identification code and the device identification code;

generating a header file corresponding to the generated service control class file and the SCPD file;

once generated, destroying the class generator object; and

repeating the selecting, generating, passing, generating and destroying for each of the one or more services of the root device.

5. (Original) The method of claim 2, wherein generating service control class files for the selected embedded device further comprises:

selecting a service from the one or more services of the selected embedded device;

generating a class generator object for the selected service of the selected embedded device;

passing an SCPD file describing the selected service, including a device identification code of the selected embedded device and a service identification code of the selected service to the class generator object;

generating, by the class generator object, a service control class file based on the received SCPD file, the service identification code and the device identification code;

generating a header file corresponding to the generated service control class file and the SCPD file;

once generated, destroying the class generator object; and

repeating the selecting, generating, passing, generating and destroying for each of the one or more services of the selected embedded device.

6. (Original) The method of claim 2, wherein generating the service linker class file further comprises:

generating a class service linker object;

storing class information regarding each generated service control class file within a service table of the class service linker object;

generating, by the class service linker object, the class service linker file based on the service table; and

destroying the class service linker object.

7. (Original) The method of claim 1, wherein receiving the service control class files further comprises:

displaying the one or more service control stub-methods to the device developer;

receiving code from the device developer for implementing the one or more service control stub-methods for responding to actions and events received by the UPnP device; and

once the code is received, storing the received code within the one or more corresponding service control stub-methods.

8. (Original) The method of claim 1, further comprising:

executing the device executable;

creating an instance of the root device and each of the one or more services of the root device;

creating an instance of each embedded device and each of the one or more services of the respective embedded device;

organizing the root device and embedded devices, as well as the services of the root device and the embedded devices within a tree hierarchy based on the device description document to form a device object tree; and

registering the root device and the one or more embedded device within the device object tree with the device class library to enable receipt of events for the services of the root device and the services of the one or more registered embedding devices.

9. (Original) The method of claim 8, wherein registering the root device and one or more embedded devices further comprises:

registering an event listener object of the device class library with the UPnP software development kit to enable receipt of action and event requests received/generated by one or more control points of the UPnP device;

registering the root device and one or more embedded devices with the event listener object;

receiving, by the event listener object, a respective action/event request from a control point;

finding a service object for response to the respective action request using a received device identification code and service identification code;

once the service object is found, invoking a callback function of the service object to determine an appropriate action method to execute in response to the respective action request;

executing the appropriate action method; and

once the action method is processed, setting an event object with a response string that is received by the control point.

10. (Currently Amended) A computer readable storage medium including program instructions that direct a computer to function in a specified manner when executed by a processor, the program instructions comprising:

~~receiving a UPnP device description document from a device developer;~~

generating one or more service control class files including one or more service-control stub-method according to a UPnP device description document received from a device developer;

receiving the service control class files including ~~updated~~ the service-control stub-methods ~~modified~~ updated by the device developer for responding to actions and events received by a UPnP device described by the UPnP device description document; and

compiling the service-control class files and the updated service-control stub-methods along with a device class library and a UPnP software development kit to generate a UPnP device executable to provide an implementation of a UPnP network protocol for the UPnP device.

11. (Original) The computer readable storage medium of claim 10, wherein generating the service-control class files further comprises:

parsing the UPnP device description document to determine a root device including one or more services and one or more embedded device each including one or more services, each service defined by a service control protocol description (SCPD) file;

generating a service-control class file for each of the one or more services of the root device;

selecting an embedded device from the one or more embedded devices of the root device;

generating a service-control class file for each of the one or more services of the selected embedded device;

repeating the generating and selecting for each of the one or more embedded devices of the root device; and

once each of the service control class files are generated, generating a class service linker class file based on the generated service-control classes, the class service linker file enabling linking the service-control classes during compiling to generate the device executable.

12. (Original) The computer readable storage medium of claim 11, further comprising:

generating a root directory for the root device;

storing each of the one or more services of the root device within the root directory;

selecting an embedded device from the one or more embedded devices of the root device;

generating a sub-root directory for the selected embedded device;

storing each of the one or more services of the selected embedded device within the sub-root directory; and

repeating generating and storing for each of the one or more embedded devices of the root device.

13. (Original) The computer readable storage medium of claim 11, wherein generating service control class files for the root device further comprises:

selecting a service from the one or more services of the root device;

generating a class generator object for the selected service of the root device;

passing an SCPD file describing the selected service, including a device identification code of the root device and a service identification of the selected service to the class generator object;

generating, by the class generator object, a service control class file based on the received SCPD file, the service identification code and the device identification code;

generating a header file corresponding to the generated service control class file and the SCPD file;

once generated, destroying the class generator object; and

repeating the selecting, generating, passing, generating and destroying for each of the one or more services of the root device.

14. (Original) The computer readable storage medium of claim 11, wherein generating service control class files for the selected embedded device further comprises:

selecting a service from the one or more services of the selected embedded device;

generating a class generator object for the selected service of the selected embedded device;

passing an SCPD file describing the selected service, including a device identification code of the selected embedded device and a service identification code of the selected service to the class generator object;

generating, by the class generator object, a service control class file based on the received SCPD file, the service identification and the device identification;

generating a header file corresponding to the generated service control class file and the SCPD file;

once generated, destroying the class generator object; and

repeating the selecting, generating, passing, generating and destroying for each of the one or more services of the selected embedded device.

15. (Original) The computer readable storage medium of claim 11, wherein generating the service linker class file further comprises:

generating a class service linker object;

storing class information regarding each generated service control class file within a service table of the class service linker object;

generating, by the class service linker object, the service class linker file based on the service table; and

destroying the class service linker object.

16. (Original) The computer readable storage medium of claim 10, wherein receiving the service control class files further comprises:

displaying the one or more service control stub-methods to the device developer;

receiving code from the device developer for implementing the one or more service control stub-methods for responding to actions and events received by the UPnP device; and

once the code is received, storing the received code within the one or more corresponding service control stub-methods.

17. (Original) The computer readable storage medium of claim 10, further comprises:

executing the device executable;

creating an instance of the root device and each of the one or more services of the root device;

creating an instance of each embedded device and each of the one or more services of the respective embedded device;

organizing the root device and embedded devices, as well as the services of the root device and the embedded devices within a tree hierarchy based on the device description document to form a device object tree; and

registering the root device and one or more embedded devices of the device object tree with the device class library to enable receipt of actions/events for the one or more services of the root device and the one or more services of the one or more registered embedded devices.

18. (Original) The computer readable storage medium of claim 17, wherein registering the root device and one or more embedded devices further comprises:

registering an event listener object of the device class library with the UPnP software development kit to enable receipt of action and event requests received/generated by one or more control points of the UPnP device;

registering the root device and one or more embedded devices with the event listener object;

receiving, by the event listener object, a respective action/event request from a control point;

finding a service object for response to the respective action request using a received device identification code and service identification code;

once the service object is found, invoking a callback function of the service object to determine an appropriate action method to execute in response to the respective action request;

executing the appropriate action method; and

once the action method is processed, setting an event object with a response string that is received by the control point.

19. (Currently Amended) ~~An apparatus~~ system, comprising:

a processor having circuitry to execute instructions;

a communications interface coupled to the processor, the communications interface to advertise services to a control point, provide device description to the control point, provide service description for each service to the control point, to receive action/event requests from the control point and to publish updates during state changes in response to received action/event requests; and

a storage device coupled to the processor, having sequences of instructions stored therein, which when executed by the processor cause the processor to:

receive the service control class files including ~~updated~~ service-control stub-methods ~~modified~~ updated by the device developer for responding to actions and events received by a UPnP device described by the UPnP device description document,

compile the service-control class files and the updated service-control stub-methods along with a device class library and a UPnP software development kit to generate a UPnP device executable to provide an implementation of a UPnP network protocol for the UPnP device described by the UPnP device description document, and

execute the UPnP device executable to enable response to actions/events received by the UPnP device.

20. (Original) The apparatus of claim 19, wherein the instruction to execute the device executable further causes the processor to:

create an instance of a root device and each of one or more services of the root device;

create an instance of each embedded device of the root device and each of one or more services of a respective embedded device;

organize the root device and embedded devices, as well as the services of the root device and the embedded devices within a tree hierarchy based on the device description document to form a device object tree;

register the device object tree with the device class library to enable receipt of actions/events for the services of the root device and the services of the embedded devices; and

register an event listener class of the device class library with the UPnP software developing kit to receive action/event requests from one or more control points of the UPnP device that are forwarded to service objects within the device object tree.

21. (Original) The apparatus of claim 19, comprising:

one or more root devices, each including one or more services for responding to actions and events received by the respective root device, and one or more embedded devices including one or more services to respond to actions and events received by a respective embedded device.

22. (Original) The apparatus of claim 20, wherein the processor is further caused to:

receive a UPnP device description document from a device developer,

generate one or more service control class files including one or more service-control stub-method based on the UPnP device description document and one or more service control protocol description files listed within the UPnP device description document, and

provide the service control class files including service-control stub-methods to the device developer in order to receive updated service control stub-methods including code for responding to actions and events received by a UPnP device described by the UPnP device description document.

Please add the following new claims:

-- 23. (New) A method comprising:

generating at least one service control class file including at least one service control stub method according to a UPnP description document received from a device developer; and

generating a UPnP device executable for ~~the~~ a UPnP device described by the UPnP description document, wherein the device executable to provide an implementation of ~~the~~ a UPnP network protocol for the UPnP device.

24. (New) The method of claim 23 wherein generating the device executable further comprises:

receiving the service control class files including the service control stub methods updated by the device developer for responding to actions and events received by the UPnP device described by the UPnP device description document; and

compiling the service control class files and the updated service control stub methods along with a device class library and a UPnP software development kit to generate the UPnP device executable.

25. (New) The method of claim 23, wherein generating the service control class file further comprises:

displaying the service control stub method to the device developer;

receiving code from the device developer for implementing the service control stub method for responding to actions and events received by the UPnP device; and

storing the code received from the device developer within the service control stub method.

26. (New) A method comprising:

displaying, to a device developer, at least one service control stub method of at least one service control class file generated according to a UPnP device description document received from the device developer; and

compiling the service control class files and the service control stub methods updated by the device developer along with a device class library and a UPnP software development kit to generate a UPnP device executable ~~for the UPnP device~~ to provide an implementation of a UPnP network protocol for the UPnP device.

27. (New) The method of claim 26, wherein displaying the at least one service control stub method further comprises:

receiving code from the device developer for implementing the service control stub method for responding to actions and events received by the UPnP device; and

storing the updated code received from the device developer within the service control stub method.

28. (New) The method of claim 26, wherein display further comprises:

receiving ~~a~~ the UPnP device description document from ~~a~~ the device developer; and

generating one or more service control class files including one or more service-control stub-methods according to ~~a~~ the UPnP device description document received from ~~a~~ the device developer.--